

Breast Cancer Rehabilitation: A Critical Review of Clinical Practice Guidelines and Evidence-based Medicine in Literature

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Abstract

Breast cancer is the most common cancer affecting women over 35 years. The primary adverse consequences after surgical treatment and often after chemotherapy or radiotherapy, are pain, upper limb impairment, postural imbalances, lymphedema, fatigue, and depression. The aim of this study is to review rehabilitative Clinical Practice Guidelines in breast cancer patients after surgical treatment and to analyze recommendations and their level of evidence.

Materials and Methods: The articles were searched for the MeSH terms "breast cancer," "guidelines," "rehabilitation," "lymphedema," "survivor," "survivorship," "therapy," "exercise," "complementary," "cognitive," "integrative," "body image," "physical therapy," "treatment," and "quality of life" in Cochrane Database of Systematic Reviews, PubMed, Science Direct. We restricted our search to full-text English language publications published between July 2006 and June 2017 and we considered only international practice guidelines that focus on rehabilitation after breast cancer surgery.

Results: We selected four guidelines focusing on primary care, rehabilitative approaches and integrative approaches. They recommend the early taking charge of the patient and to manage upper limb dysfunctions, lymphedema, pain, fatigue, peripheral neuropathy, body image concerns and lifestyle recommendations.

Conclusions: The current model of care for women with breast cancer focuses mostly on treatment of disease; this approach too often lacks attention to patients' physical and functional well-being. Many criticisms emerge from this review.

We suggest that there is a need to strengthen the level of evidence for many commonly used clinical practices and to better describe innovative rehabilitative approaches.

Highlights

- Breast cancer is the most common cancer affecting women over 35 years;
- There is an increasing of survivor patients;
- The latest guidelines on breast cancer are not exhaustive about rehabilitation and complications after surgery;
- There is the need to strengthen the level of evidence of many commonly used clinical rehabilitation practices and to better describe rehabilitative approaches for breast cancer survivors.
- Only 4 breast cancer guidelines were interested in rehabilitation for survivor patients in the latest 10 years.

Introduction

Breast cancer (BC) is the most common worldwide cancer affecting women over 35 years old, representing 25% of all new cancer cases¹. Therapeutic management of BC includes surgery and, if necessary, radiation therapy, systemic treatments, such as chemotherapy, endocrine therapy, biologic therapy or some combination². The primary adverse consequences after surgical treatment and, often after chemotherapy or radiotherapy, are pain (post-surgical treatment, post-chemotherapy, post-radiotherapy), upper limb impairment, postural imbalances, lymphedema, fatigue, and depression³⁻⁵. Because of the increasing BC survivors, the rehabilitation is becoming more important: rehabilitation goals are to encourage an appropriate recovery of activities of daily living (ADL), prevent and alleviate adverse treatment outcomes and promote quality of life (QoL). In the literature, there are no univocal approaches to rehabilitation after BC surgery and there is a lack of specific rehabilitative guidelines⁶⁻⁸. Then, we conducted a systematic search in the most important databases because this review aims to highlight and address an important deficit in the current rehabilitative approaches reviewing rehabilitative clinical practice guidelines in BC patients after surgical treatment and critically analyzing also recommendations and their level of evidence respect to specific area of rehabilitative good practice points.

Material and Methods

Search terms

We conducted a systematic search in the following databases: Cochrane Database of Systematic Reviews, PubMed, Science Direct. We restricted our search to full-text English language publications that were published between July 2006 and June 2017, and we considered only international practice guidelines that focus on

rehabilitation after breast cancer surgery. We excluded guidelines that were written without a multidisciplinary (MD) or multiprofessional (MP) team. We also did not include consider guidelines that did not use a clear grading system to express recommendations.

The articles were searched for the following MeSH terms: “breast cancer,” “guidelines,” “rehabilitation,” “lymphedema,” “survivor,” “survivorship,” “therapy,” “exercise,” “complementary,” “cognitive,” “integrative,” “body image,” “physical therapy,” “treatment,” and “quality of life.” We excluded guidelines without a clear level of evidence for the recommendations, guidelines without rehabilitative recommendations, and guidelines for patients under 18 years old. Unpublished guidelines (gray literature) were not included.

Two authors, who are expert clinicians and researchers in breast cancer rehabilitation, performed the literature search and data extraction independently. The discrepancies between the two authors were handled by comparing the results obtained with a third supervisor.

Results

From 61 scientific publications that were screened, we selected four guidelines⁹⁻¹² (Table 1). The two guidelines on integrative therapies clearly are not only about rehabilitation but also have many sections on rehabilitation; thus, we decided to include them. However, the medical management of these patients also includes general wellness, body image, and cardiac and bone health, which are inconsistently managed by rehabilitation clinicians; consequently, these aspects were not included in this narrative review. Only two guidelines have a patient association on the team¹⁰⁻¹¹.

Every scientific society uses a different grading to express its recommendations: LOE (level of evidence) for the American Cancer Society (ACS) guidelines 2016,

Table 1. Syntheses of International Guidelines

GUIDELINE	SOCIETY	JOURNAL, YEAR	MD	MP	Grading
<i>Clinical Practice Guidelines on the Evidence-Based Use of Integrative Therapies During and After Breast Cancer Treatment. American Cancer Society</i> ⁹	American Cancer Society	CA Cancer J Clin 2017	YES	YES	UNK (US PREVENTIVE TASK FORCE GRADING SYSTEM)
<i>American Cancer Society/American Society of Clinical Oncology Breast Cancer Survivorship Care Guideline</i> ¹⁰	American Cancer Society	CA Cancer J Clin 2016	YES [P]	YES	UNK (Level of Evidence - LOE)
<i>Clinical practice guidelines on the use of integrative therapies as supportive care in patients treated for breast cancer</i> ¹¹	Society for Integrative Oncology Guidelines Working Group	J Natl Cancer Inst Monogr 2014	YES [P]	YES	UNK (Adapted US PREVENTIVE TASK FORCE GRADING SYSTEM)
<i>Clinical Practice Guidelines for Breast Cancer Rehabilitation</i> ¹²	American Cancer Society	Cancer 2012	YES	YES	UNK (AGREE II)

Table 1 Guidelines characteristics (MD = multidisciplinary, MP = multiprofessional, [P] = patient association or consumers, AGREE II: Appraisal of Guidelines for Research and Evaluation II
UNK = unknown

AGREE II for the American Cancer Society to rate the methodological quality of current practice guidelines, US Preventive Services Task Force (USPSTF) grading system for ACS guidelines 2017 and Society for Integrative Oncology (SIO) Guidelines Working Group 2014^{10,13-15}.

In general, the role of a physiatrist is to manage problems that can occur immediately after the surgery, during chemotherapy or radiotherapy, or years after surgery. In fact, ACS guidelines 2016 recommend that the patient receives a detailed cancer-related history and physical examination every 3 to 6 months for the first three years after primary therapy, every 6-12 months for the next two 2 years, and annually thereafter (LOE = 2A) (see Table 2)¹⁰. Screening for local recurrence provides annual mammography for women who have undergone a mastectomy (LOE = 2A), whereas magnetic resonance imaging should be limited to patients who meet high-risk criteria for increased breast cancer surveillance (LOE = 2A)¹⁰. It is recommended that all women be educated and counseled about the signs and symptoms of local or

regional recurrence (LOE = 2A)¹⁰. Furthermore, ACS CPG 2016 recommends that primary care clinicians should maintain communication with the oncology team (LOE = 0), as well as encourage the inclusion of caregivers in usual breast cancer survivorship care and support (LOE = 0)¹⁰. It is clear that this role cannot be managed only by the general practitioner (as occurs in many countries, including Italy) but should be taken up by the physiatrist.

The most important rehabilitative fields that we identified in the selected guidelines were the following.

Lymphedema

Breast cancer related lymphedema is a chronic and distressing condition that is estimated to affect between 12.5% and 49% of women who undergo surgical lymphatic vessel/node extirpation or radiation therapy, with a lower incidence in sentinel node negative patients¹⁴. It can develop directly after surgery or radiation therapy or months and even years later¹⁶.

Table 2. Grading Systems adopted by Clinical Practice Guidelines

Level of Evidence (LOE)		
LEVEL OF EVIDENCE	CRITERIA	
I	Meta-analysis of randomized controlled trials (RCTs)	
IA	RCT of breast cancer survivors	
IB	RCT based on cancer survivors across multiple cancer sites	
IC	RCT not based on cancer survivors, but on patients in the general population experiencing a specific long-term or late effect (eg, managing menopausal symptoms, sexual dysfunction, etc)	
IIA	Non-RCTs based on breast cancer survivors	
IIB	Non-RCTs based on cancer survivors across multiple sites	
IIC	Non-RCTs not based on cancer survivors but on members of general population experiencing a specific long-term or late effect	
III	Case-control study or prospective cohort study	
0	Expert opinion, observational study (excluding case-control and prospective cohort studies), clinical practice, literature review, or pilot study	
2A	NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines)	
Adapted from US Preventive Services Task Force (USPSTF)		
GRADE	DEFINITION	SUGGESTIONS FOR PRACTICE
A	Recommends the modality. There is high certainty that the NET BENEFIT IS SUBSTANTIAL.	Offer/provide this modality
B	Recommends the modality. There is high certainty that the net benefit is moderate, or there is moderate certainty that the NET BENEFIT IS MODERATE TO SUBSTANTIAL.	Offer/provide this modality
C	Recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the NET BENEFIT IS SMALL.	Offer/provide this modality for selected patients depending on individual circumstances
D	Recommends against the service. There is moderate or high certainty that the modality has NO NET BENEFIT.	Discourage the use of this modality
H	Recommends against the service. There is moderate or high certainty that the HARMS OUTWEIGH THE BENEFITS.	Discourage the use of this modality
I statement	Concludes that the CURRENT EVIDENCE IS INSUFFICIENT to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.	Read the Clinical Considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms

Table 2. Grading system: LOE criteria¹⁹ and US Preventive Services Task Force^{18,20}, adopted by ACS 2016 and SIOGWG 2014/ACS 2017, respectively.

Only ACS guidelines 2012 give indications about how to measure arm circumferences in lymphedema. They identify four points to measure: a) the metacarpal-phalange joints; b) the wrists; c) 10 cm distal to the lateral epicondyles; and d) 12 cm proximal to the lateral epicondyles¹². Circumferential measurements should be taken preoperatively, postoperatively, and during monitoring treatment. To warrant treatment, it is necessary to have a difference between the two arms of more than 2.0 cm at any of the four measurement points, provided that tumor involvement in the axillaries or brachial plexus, infection, and axillaries vein thrombosis have been ruled out¹².

Interventions for secondary lymph edema management include a) complete decongestive therapy (CPT); b) manual lymphatic drainage (MLD); c) self-massage; d) intermittent pneumatic compression therapy; e) compression garment/sleeve; f) compression bandaging; g) low-level laser therapy (LLLT); h) oral pharmaceuticals; and i) surgical treatment^{17,18}

ACS guidelines 2012 identify complete decongestive therapy as the standard¹². They also encourage the use of compression garments that should be worn from morning to night and removed at bedtime¹², even if some evidence in the literature indicates that compression garments can only keep the minimum limb volume possible and prevent additional swelling¹⁷.

The CPG recommends considering manual lymphatic drainage and compression bandaging to improve lymphedema in patients without metastasis, although these treatments are only supported with a doubtful/moderate evidence level (grade C)^{27,29}. In other studies, compression bandaging, which is useful in reducing edema volume in

the intensive phase²⁵, induces more pronounced and more rapid volume reduction than compression garments^{19,20}.

There is a trend toward using pneumatic compression pumps¹². Although further randomized trials are required, a recent meta-analysis suggests that pneumatic compression pumps can reduce lymphedema volume in the intensive phase^{20,21}, but it is not maintained in the maintenance phase²².

Regarding pharmacological therapy, ACS guidelines 2012 conclude that there is no evidence to support the use of diuretics, benzopyrones, or selenium compounds¹², because studies on the efficacy of coumarin, diosmin, hesperidin, Cyclo-Fort, and benzopyrones have reported conflicting results²³⁻²⁷.

Weight loss in overweight/obese women is recommended for reducing lymphedema symptoms¹⁰.

Table 3. Legend: R = recommended; DR = doubtful recommendation; NR = not recommended; - = not cited; 0 = expert opinion, observational study (excluding case-control and prospective cohort studies), clinical practice, literature review, or pilot study; I = meta-analyses of RCTs; I B = RCT based on cancer survivors across multiple cancer sites; B = recommends the modality. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial; C = recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.

Pain and peripheral neuropathy

Pain is common during and after breast cancer

Table 3. Therapeutic and Rehabilitation Recommendations for Lymphedema

Proposed Rehabilitative Treatment	ACS 2017	ACS 2016	SIOGWG 2014	ACS 2012
Lymphedema				
Complete decongestive therapy	-	-	-	R
Manual lymphatic drainage	R (C)	-	R (C)	R
Self/partner massage	-	-	-	R
Pneumatic compression therapy	-	-	-	DR
Compression garments	-	-	-	R
Compression bandaging	R (C)	-	R (C)	R
Laser therapy	R (C)	-	R (C)	-
Electrotherapy	-	-	-	-
Oral pharmaceuticals (diuretics, benzopyrones, selenium compounds)	-	-	-	DR
Weight loss (for overweight or obese patients)	-	R (0)	-	-
Kinesio-taping	-	-	-	-
Surgical treatment	-	-	-	-

Table 3. Legend: R = recommended; DR = doubtful recommendation; NR = not recommended; - = not cited; 0 = expert opinion, observational study (excluding case-control and prospective cohort studies), clinical practice, literature review, or pilot study; I = meta-analyses of RCTs; I B = RCT based on cancer survivors across multiple cancer sites; B = recommends the modality. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial; C = recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.

Table 4. Therapeutic and Rehabilitation Recommendations for Pain Management

Proposal Treatment	ACS 2017	ACS 2016	SIOGWG 2014	ACS 2012
Acetaminophen	-	R (I)	-	-
NSAIDs	-	R (I)	-	-
Duloxetine	-	R (I B)	-	-
TENS	-	-	-	R
Physical activity	-	R (I)	-	-
Physiotherapy or therapeutic exercise	-	-	-	R
Physical training program that includes a mind-body modality	-	-	R (C)	-
Balance reeducation	-	-	-	R
Massage	-	-	R (C)	-
Acupuncture	R (C)	R (I)	R (C)	R
Electro-acupuncture	-	-	R (C)	-
Music therapy	R (C)	-	-	-
Healing touch	R (C)	-	R (C)	-
Hypnosis	R (C)	-	R (C)	-
Energy conservation strategies	-	-	R (C)	-
Occupational therapy consultation	-	-	-	R

Table 4. Legend: R = recommended; DR = doubtful recommendation; NR = not recommended; - = not cited; 0 = expert opinion, observational study (excluding case-control and prospective cohort studies), clinical practice, literature review, or pilot study; I = meta-analyses of RCTs; I B = RCT based on cancer survivors across multiple cancer sites; B = recommends the modality. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial; C = recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.

treatment, with a prevalence between 40% and 89%²⁷. A multidisciplinary approach is fundamental to managing patient pain²⁰. The selected guidelines converge on the need to use pain scales both in identifying the intensity of early-onset pain and for regular monitoring of treatment results. ACS guidelines 2016 recommend the use of *acetaminophen* and NSAIDs (LOE = I); for patients with neuropathic pain, they suggest the use of *duloxetine* (LOE = IB)¹⁸. Pain treatment and goals should be tailored to the needs, desires, and circumstances of individual patients¹².

In addition to drugs, it is necessary to consider non-pharmacological interventions. The ACS guidelines 2012 recommend physical interventions, such as the *transcutaneous electrical nerve stimulation* (TENS), the *bed, bath and walking supports*, the *positioning instruction*, the *energy conservation strategies*, the *pacing of activities*, the *acupuncture or acupressure* and the *occupational therapy consultation*¹².

For the treatment of postsurgical and post chemotherapy pain, ACS guidelines 2017 and SIO Guidelines Working Group 2014 report (grade C) some alternative therapies, such as acupuncture, music therapy, hypnosis. and healing touch^{11,13,28-30}

The occurrence of peripheral neuropathy in breast cancer survivors requires a differential diagnosis to identify its etiology (surgery, radiotherapy, chemotherapy). The identified guidelines refer only to chemotherapy-induced peripheral neuropathy (CIPN)¹⁸.

The ACS CPG 2016 suggests that primary care clinicians should *investigate for peripheral neuropathy symptoms—specifically, numbness and tingling in the patient’s hands and/or feet—and assess contributing factors for pain* (LOE = 0)¹⁰. The ACS 2017 and SIO 2014 guidelines do not recommend the use of *acetyl-L-carnitine* or *guaranà*, due to the lack of clinical trials in neoplastic patients (grade D)^{9,11}. ACS guidelines 2012 reports *acupuncture* as an adjunctive, non-invasive, and relatively inexpensive option in medication-resistant patients and recommends *TENS* in those patients for whom pain medication is contraindicated or ineffective; it also recommends *referral to an occupational therapist*¹².

Fatigue

Fatigue is a commonly observed symptom, particularly among radio- and chemotherapy patients. ACS guidelines 2016 recommend *assessing and treating any causative factors of fatigue* (such as anemia, thyroid dysfunction, cardiac dysfunction) (LOE = 0) and *factors that may impact fatigue* (such as mood disorders, sleep disturbance, pain) (LOE = I)¹⁰. The ACS CPG 2012 recommends encouraging patients to engage in *moderate-intensity physical activity* during and after treatment, including *walking, cycling, resistance exercise*, or a *combination of aerobic and resistance exercise* for 30 minutes most days of the week¹². The ACS CPG 2016 recommends that primary care clinicians counsel patients to engage in *regular physical activity*, as well as refer them for *cognitive-behavioral therapy* (LEO = I)¹⁰.

The SIO Guidelines Working Group recommends *energy conservation* (grade B)^{9,32}. The ACS guidelines 2017 and SIOGWG 2014 suggest *hypnosis* and *ginseng* as alternative methods for reducing fatigue during treatment (grade C)^{9,11}. The use of *acetyl L-carnitine* and *guaranà* is not recommended due to the lack of efficacy tests and studies on possible long-term side effects (grade D). *Acupuncture*, as well as *qigong*, can be considered (grade C)^{9,11}.

Upper limb limitations and/or postural dysfunction

The ACS guidelines 2016 recommend that primary care clinicians *assess musculoskeletal symptoms, including pain* (LOE = 0), and offer *acupuncture, physical activity, physical therapy, or rehabilitation* (LOE = III)¹⁰.

The only guideline that specifically considers upper limb limitations is the American Cancer Society Breast Cancer Rehabilitation Guideline 2012, which specifies that *bilateral upper extremity function should be assessed preoperatively*¹². Physical therapy should begin on the first postsurgical day, with *gentle range of motion exercises* encouraged the first week after surgery. *Active stretching exercises* can begin in the first postoperative week or at drainage removal and should be continued for 6 to 8 weeks¹² or until full range of motion is achieved and it is also useful to instruct patients in *scar tissue massage*. Between the 4th and 6th postoperative week, *progressive resistance exercises* can begin with light weights (1-2 pounds). It is important to minimize the risk of infections and secondary lymphedema by properly *caring for limb skin, minimizing the extent of axillary dissection; avoiding trauma to the arm, body weight gains, vaccinations, venous bites, and intravenous access to the axillary-dissected upper limb; and promptly initiating antibiotic therapy* if an infection is suspected¹².

Among non-pharmacological interventions, *laser therapy, electrical stimulation, endogenous microwave thermotherapy, and thermal therapy* are not recommended due to insufficient evidence to support their use¹². *Therapeutic ultrasound*, however, is absolutely contraindicated, even in non-metastatic patients, due to the possible risk of metastatic dissemination¹².

Lifestyle recommendations and psychological support

Even if this part of breast cancer patient care is typically addressed by a general practitioner, the physiatrist also needs to highlight some important advice for early and better recovery after surgery. All guidelines emphasize the importance of a healthy lifestyle. There is evidence that a body mass index (BMI) of greater than 30 represents a risk factor for the onset of secondary lymphedema^{12,32}. Weight gain also has a negative effect on functional prognosis¹².

It is important to *discourage weight gain*, encourage *the maintenance of a healthy BMI*, and offer a *nutritional consultation* if needed¹². According to the ACS guidelines

2016, an adequate dietary model should include a high content of vegetables, fruits, whole grains, and legumes; a low content of saturated fat; and limited alcohol consumption (LOE = IA, III)¹².

Clinicians should advise patients to achieve and maintain a healthy weight, especially for overweight or obese patients (LOE = III)^{10,12}; to limit the consumption of high-calorie foods and beverages (LOE = IA); to increase physical activity (LOE = III) and to undertake regular physical activity and return to normal daily activity as soon as possible (LOE = III)¹⁰.

In relation to exercise, ACS guidelines 2012 suggest that long-term, regular (moderate- to high-aerobic) physical activity is associated with a favorable prognosis and that aerobic exercise and weight lifting do not contribute to the development of secondary lymphedema¹². The ACS guidelines 2016 recommend: a) to aim for at least 150 minutes of moderate exercise or 75 minutes of vigorous aerobic exercise each week (LOE = I, IA) and b) to include muscle strengthening exercises at least 2 days a week and stimulate reinforcement in women who have been treated with adjuvant chemotherapy or hormone therapy (LOE = IA)¹⁰.

It is advisable to encourage patients to avoid cigarette smoking by inviting them to contact a smoking counselor, if necessary (LOE = I)¹⁰.

To improve the patient's quality of life, the ACS guidelines 2017 and SIOGWG 2014 recommend—with varying levels of evidence—*meditation* (grade A), *yoga* (grade B), *acupuncture* (grade C), *qigong* (grade C), *plantar reflexology* (grade C), *stress management* (grade C), *mistletoe therapy* (grade C)^{9,11,33,34}, and *yoga practice for sleep disturbance management* (grade C)^{9,11}.

Most women experience at least some psychosocial distress during the course of their BC diagnosis and treatment and the level of distress varies from woman to woman and, within an individual, over the course of diagnosis and treatment. Then, during the rehabilitation process, psychological support is very important to help patients overcome the trauma of the disease and manage more adequate coping strategies (as fear of recurrence and marital/partner communication)³⁵. At the moment there are no specific guidelines on the psychological treatment of women after breast cancer, although interest on this topic is increasing and starts to show the importance, for example, of choosing a correct setting or single treatment rather than group treatment. Since treatment often requires breast surgery, a combination of chemotherapy and radiation, and antiestrogen treatment that hastens menopause, the psychological effects are different for premenopausal women married with children, women concerned about their physical attractiveness or who want

to preserve fertility, and women concerned about the effect on their partners^{37,38}.

Also, support from breast care nurse can significantly reduce psychological morbidity³⁹. Specific interventions after BC can effectively target biopsychosocial impacts of stress and promote adaptive coping, focusing on problem-solving, social support utilization, assertive communication, sexual health and intimacy, adherence to medical and supportive care recommendations, health behavior change, and emotional processing and expression⁴⁰.

Body image

The ACS 2016 is the only guideline that includes *assessing concerns that breast cancer patients may develop in relation to their physical appearance and self-image* (Level 0)¹⁶. Primary care clinicians should propose the option of *adaptive devices* (including breast prostheses, wigs) and *reconstructive surgery* when appropriate (level 0) and provide *psycho-social assistance* (Level IA)⁸.

Discussion

Women's experiences with breast cancer affect many aspects of their lives, from the cancer diagnosis until many years later⁴². A thorough discussion of the psychological needs of survivor breast cancer women is beyond the scope of this paper because we focused on activity limitations and problems of strictly physiatrist relevance.

Immediately after surgery, during the "early phase," it is necessary to inform and guide patients on the recovery of daily life activities and to limit and treat impairments after surgery^{42,43}. Rehabilitative intervention must begin soon after surgery, regardless of the type of surgery (quadrantectomy or mastectomy) and should aim to recover the range of motion (ROM) of the upper limb on the operated side, recover strength, and control pain. At a later stage, it is also important to consider the recovery of a correct postural assessment. Evidence suggests that rehabilitation is effective in preventing and managing many physical side effects of breast cancer treatment⁴². Multifactorial physical therapy and active exercises are effective in treating postoperative pain and impaired ROM after treatment for BC⁴⁴. The steadily increasing survival rate after BC results in a growing need for rehabilitative treatments for short- and long-term sequelae, especially in the upper limb¹³ that which emphasize the need for standardized rehabilitation protocols. In the literature, a wide variation in the prevalence of these sequelae has been reported for shoulder pain (from 12% to 51%), the reduction in the range of shoulder motion (from 2% to 51%), and muscle strength (from 17% to 33%)⁴⁵.

Rehabilitation methods and their effectiveness vary not only because of the differences between patients but because guidelines are few and incomplete: too often, a

physiatrist is called to manage problems well after they have developed and without clear support guidelines.

Lymphedema appears to worsen asymmetries and modifications in posture after mastectomy⁴⁶. Moreover, the literature is lacking in studies on posture balance after breast cancer surgery^{47,48}. In lymphedema management, three guidelines agree (with different levels of recommendation) with the use of manual lymphatic drainage and the use of acupuncture; two of the guidelines agree with the use of compression bandages and laser therapy. None of the guidelines provides specific treatment selection criteria regarding secondary upper limb lymphedema or provides precise indications about lymphatic drainage practices (method, precaution, duration) or modalities (contraindications, parameter intensity, duration, number of sessions)^{17,49}.

With respect to pain management, ACS guidelines recommend the use of NSAIDs, and all of the guidelines agree with the use of acupuncture but do not provide an unequivocal view of pain management.

Scientific evidence for the use of TENS to address antalgic gait is currently insufficient in neoplastic patients⁵⁰ and breast cancer survivors⁵¹, although a randomized clinical trial has reported parietal region electrocortical modifications that could explain the efficacy of TENS in patients with intercostobrachial nerve pain after breast cancer surgery⁵².

With respect to fatigue, guidelines emphasize the importance of assessing and treating any causative factors of fatigue and factors that may impact fatigue. They also promote regular physical activity and cognitive-behavioral therapy.

Only one guideline¹⁰ stresses the importance of therapeutic exercise and physiotherapy, giving some indications about the type and quality of exercise that is recommended. In the literature, we must note that there are many specific reviews on rehabilitation exercises to follow, but these reviews do not provide sufficient evidence to support their guidelines satisfactorily^{53,54}.

There are other important rehabilitative issues that lack clear guidelines from the literature search. Emerging therapeutic options, such as Kinesio-taping^{55,56} are not reported in the guidelines. There are few recommendations on the management of complications, such as lymphangitis and axillary web syndrome (AWS). There is a lack of recommendations on body image concerns, which are overwhelmingly covered by rehabilitation guidelines. All selected guidelines exclude metastatic patients; thus, there are no recommendations about metastatic bone pain or vertebral collapse^{57,58}

There are no recommendations about rehabilitation in

patients with a breast expander or definitive prosthesis, despite the importance of these devices in improving body shape, self-confidence, balance, and posture⁶⁰. With respect to a surgical approach during the follow-up phase, the aforementioned guidelines do not give any selection criteria for patients with breast cancer-related lymphedema who can benefit from microsurgical techniques or indications to prevent postural alterations^{5,43,45,47}. Existing guidelines do not provide indications for different approaches after radical surgery compared with conservative surgery and do not discuss gender differences in the rehabilitative approach.

The survival rate of women after breast cancer has improved significantly worldwide, for this reason cancer rehabilitation is very important to help breast cancer survivors maintain the highest possible physical, social, psychological, and vocational function in the limits that are imposed by the cancer treatments. Rehabilitation should be considered as a way to a global and complete return to "life after cancer". For this reason it should include also psychosocial support recommendations, that are not considered in the principals guidelines.

Conclusion

In conclusion, the current model of care for women with breast cancer focuses mostly on treatment of disease; this approach too often lacks attention to patients' physical and functional well-being. Many criticisms emerge from this review. The figure of the physiatrist has been involved in only one of the guidelines, despite clear evidence of the importance of a multidisciplinary and multiprofessional team⁵⁴ in promoting an early and complete rehabilitative approach.

We suggest that there is a need to strengthen the level of evidence for many commonly used clinical practices and to describe innovative rehabilitative approaches better. Based on these assumptions, there is a clear need for a new best practice formulation and new multidisciplinary, multiprofessional guidelines that use a standardized system of evaluating evidence in the rehabilitation of breast cancer treated patients.

Conflict of interest statement

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References

1. International Agency For Research On Cancer, Breast Cancer: Estimated Incidence, Mortality and Prevalence Worldwide. World Health Organization 2014.
2. NCCN. National Comprehensive Cancer Network Clinical Practice Guidelines Breast Cancer Version 2. 2016, National Comprehensive Cancer Network 2016.
3. Luctkar-Flude M, Aiken A, McColl MA, et al. A comprehensive framework and key guideline recommendations for the provision of evidence-based breast cancer survivorship care within the primary care setting. *Family Practice*. 2015; 32(2): 129-140.
4. Scaffidi M, Vulpiani MC, Vetrano M, et al. Early rehabilitation reduces the onset of complications in the upper limb following breast cancer surgery. *Eur J Phys Rehabil Med*. 2012 Dec; 48(4): 601-11.
5. Harbeck N, Ewer MS, De Laurentiis M, et al. Cardiovascular complications of conventional and targeted adjuvant breast cancer therapy. *Ann Oncol*. 2011 Jun; 22(6): 1250-8.
6. Loh SY, Musa AN. Methods to improve rehabilitation of patients following breast cancer surgery: a review of systematic reviews. *Breast Cancer (Dove Med Press)*. 2015 Mar 11; 7: 81-98.
7. Volaklis KA, Halle M, Tokmakidis SP. Exercise in the prevention and rehabilitation of breast cancer. *Wien Klin Wochenschr*. 2013 Jun; 125(11-12): 297-301.
8. Khan F, Amatya B, Pallant JF, et al. Multidisciplinary rehabilitation in women following breast cancer treatment: a randomized controlled trial. *J Rehabil Med*. 2012 Sep; 44(9): 788-94.
9. Greenlee H, DuPont-Reyes MJ, Balneaves LG, et al American Cancer Society, Clinical Practice Guidelines on the Evidence-Based Use of Integrative Therapies During and After Breast Cancer Treatment, *CA Cancer J Clin*. 2017; 67(3): 194-232.
10. Runowicz CD, Leach CR, Henry NL, et al. American Cancer Society/American Society of Clinical Oncology Breast Cancer Survivorship Care Guideline. *CA Cancer J Clin*. 2016; 66(1): 43-73.
11. Greenlee H, Balneaves LG, Carlson LE, et al. Society for Integrative Oncology, Clinical practice guidelines on the use of integrative therapies as supportive care in patients treated for breast cancer. *J Natl Cancer Inst Monogr*. 2014 ;50: 346-58.
12. Harris SR, Schmitz KH, Campbell KL, et al. Clinical Practice Guidelines for Breast Cancer Rehabilitation: Syntheses of Guideline Recommendations and Qualitative Appraisals. *Cancer*. 2012; 118(8 Suppl): 2312-24.
13. Us Preventive Services Task Force, Grade Definitions. uspreventiveservicestaskforce.org/uspstf/grades.htm. Accessed 2014. Accessed May 10, 2014.
14. Brouwers MC, Kho ME, Browman GP, et al. AGREE Next Steps Consortium, Development of the AGREE II, part 1: performance, usefulness and areas for improvement. *CMAJ*. 2010; 182: 1045-1052.
15. Brouwers MC, Kho ME, Browman GP, et al. AGREE Next Steps Consortium, Development of the AGREE II, part 2: assessment of validity of items and tools to support application. *CMAJ*. 2010; 182: E472-E478.
16. Petrek JA, Senie RT, Peters M, et al. Lymphedema in a cohort of breast carcinoma survivors 20 years after diagnosis. *Cancer*. 2001; 92(6): 1368-1377.
17. Rogan S, Taeymans J, Luginbuehl H, et al. Therapy modalities to reduce lymphoedema in female breast cancer patients: a systematic review and meta-analysis. *Breast Cancer Res Treat*. 2016; 159(1): 1-14.
18. Valobra GN. Nuovo trattato di Medicina Fisica e Riabilitazione. Utet Scienze Mediche. 2008; Vol III: 2365-2373.
19. Moseley AL, Carati CJ, Piller NB. A systematic review of common conservative therapies for arm lymphoedema secondary to breast cancer treatment. *Annals of Oncology*. 2007; 18(4): 639-646.
20. Haghigat S. Comparing two treatment methods for post mastectomy lymphedema: complex decongestive therapy alone and in combination with intermittent pneumatic compression. *Lymphology*. 2010; 43(1): 25-33.

21. Szuba A. Decongestive lymphatic therapy for patients with breast carcinoma-associated lymphedema. A randomized, prospective study of a role for adjunctive intermittent pneumatic compression. *Cancer*. 2002; 95(11): 2260-2267.
22. Shao Y, Qi K, Zhou QH, et al. Intermittent Pneumatic Compression Pump for Breast Cancer-Related Lymphedema: a Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Oncol Res Treat*. 2014; 37(4): 170-174.
23. Burgos A, Alcaide A, Alcoba C, et al. Comparative study of the clinical efficacy of two different coumarin dosages in the management of arm lymphedema after treatment for breast cancer. *Lymphology*. 1999; 32: 3-10.
24. Loprinzi CL, Kugler JW, Sloan JA, et al. Lack of effect of Coumarin in women with lymphedema after treatment for breast cancer. *New Eng J Med*. 1999; 5: 346-350.
25. Pecking AP, Février B, Wargon C, et al. Efficacy of Daflon 500 mg in the treatment of lymphedema (Secondary to conventional therapy of breast cancer). *Angiology*. 1997; 48(1): 93-98.
26. Cluzan RV, Alliot F, Ghabboun S, et al. Treatment of secondary lymphedema of the upper limb with Cyclo 3 Fort. *Lymphology*. 1996; 29: 29-35.
27. Casley-Smith JR, Morgan RG, Piller NB. Treatment of lymphedema of the arms and legs with 5,6-benzo-alpha-pyrone. *New Eng J Med*. 1993; 329(16): 1158-1163.
28. Burrai F. Therapeutic Touch: assistenza infermieristica basata sull'energia. *Int Nurs Perspect*. 2009; 9(1): 21-28.
29. Post-White J, Kinney ME, Savik K, et al. Therapeutic massage and healing touch improve symptoms in cancer. *Integr Cancer Ther*. 2003; 2(4): 332-344.
30. FitzHenry F, Wells N, Slater V, et al. A randomized placebo-controlled pilot study of the impact of healing touch on fatigue in breast cancer patients undergoing radiation therapy. *Integr Cancer Ther*. 2014; 13(2): 105-113.
31. Barsevick AM, Dudley W, Beck S, et al. A randomized clinical trial of energy conservation for patients with cancer-related fatigue. *Cancer*. 2004; 100(6): 1302-1310.
32. Poage E, Singer M, Armer J, et al. Demystifying lymphedema: development of the lymphedema putting evidence into practice card. *Clin J Oncol Nurs*. 2008; 12: 951-964.
33. Horneber MA. Mistletoe therapy in oncology. *Cochrane Database Syst Rev*. 2008; (2): CD003297.
34. Marvibaigi M, Supriyanto E, Amini N, et al. Preclinical and clinical effects of mistletoe against breast cancer. *Biomed Res Int*. 2014; 2014: 785479.
35. Hewitt M, Herdman R, Holland J, editors. Meeting Psychosocial Needs of Women with Breast Cancer. Institute of Medicine (US) and National Research Council (US) National Cancer Policy Board; Washington (DC): National Academies Press (US); 2004.
36. Paolucci T, Bernetti A, Paoloni M, et al. Therapeutic alliance in a single versus group rehabilitative setting after breast cancer surgery: psychological profile and performance rehabilitation. *Biores Open Access*. 2019 Jul 3; 8(1): 101-110.
37. Li Y, Wang K, Yin Y, et al. Relationships between family resilience, breast cancer survivors' individual resilience, and caregiver burden: A cross-sectional study. *Int J Nurs Stud*. 2018 Dec; 88: 79-84. doi: 10.1016/j.ijnurstu.2018.08.011
38. Şengün İnan F, Üstün B. Home-Based Psychoeducational Intervention for Breast Cancer Survivors. *Cancer Nurs*. 2018 May/June; 41(3): 238-247.
39. McArdle JM, George WD, McArdle CS, et al. Psychological support for patients undergoing breast cancer surgery: a randomised study. *BMJ*. 1996 Mar 30; 312(7034): 813-6
40. Gudenkauf LM, Ehlers SL. Psychosocial interventions in breast cancer survivorship care. *Breast*. 2018 Apr; 38: 1-6. Binkley JM, Harris SR, Levangie PK, et al. Patient perspectives on breast cancer treatment side effects and the prospective surveillance model for physical rehabilitation for women with breast cancer. *Cancer*. 2012 Apr 15; 118(8 Suppl): 2207-16.
41. Schieron MP, SIMFER La Riabilitazione in Oncologia. La presa in carico multidisciplinare e i percorsi riabilitativi diagnostico-terapeutici dei pazienti affetti da tumore, Sez. I, pp 6-7 Edizioni Medico Scientifiche 2017.
42. Testa A, Iannace C, Di Libero L. Strengths of early physical rehabilitation programs in surgical breast cancer patients: results of a randomized controlled study. *Eur J Phys Rehabil Med*. 2014 Jun; 50(3): 275-84.
43. De Groef A, Van Kampen M, Dieltjens E, et al. Effectiveness of postoperative physical therapy for upper-limb impairments after breast cancer treatment: a systematic review. *Arch Phys Med Rehabil*. 2015 Jun; 96(6): 1140-53.
44. Lee TS, Kilbreath SL, Refshauge KM, et al. Prognosis of the upper limb following surgery and radiation for breast cancer. *Breast Cancer Research and Treatment*. 2008; 110(1): 19-37.
45. Haddad CA, Saad M, Perez Mdel C, et al. Assessment of posture and joint movements of the upper limbs of patients after mastectomy and lymphadenectomy. *Einstein (Sao Paulo)*. 2013 Dec; 11(4): 426-34.
46. Amatya B, Khan F, Galea MP. Optimizing post-acute care in breast cancer survivors: a rehabilitation perspective. *J Multidiscip Healthc*. 2017 Aug 30; 10: 347-357.
47. Luoma ML, Hakamies-Blomqvist L, Blomqvist C, et al. Experiences of breast cancer survivors participating in a tailored exercise intervention - a qualitative study. *Anticancer Res*. 2014 Mar; 34(3): 1193-9.
48. Khan F, Amatya B, Pallant JF, et al. Multidisciplinary rehabilitation in women following breast cancer treatment: a randomized controlled trial. *J Rehabil Med*. 2012 Sep; 44(9): 788-94.
49. Hurlow A, Bennett MI, Robb KA, et al. Transcutaneous electric nerve stimulation (TENS) for cancer pain in adults. *Cochrane Database Syst Rev*. 2012; 14(3): CD006276. doi: 10.1002/14651858.CD006276.pub3.
50. Robb KA, Newham DJ, Williams JE. Transcutaneous electrical nerve stimulation vs. transcutaneous spinal electroanalgesia for chronic pain associated with breast cancer treatments. *J Pain Symptom Manage*. 2007; 33(4): 410-9.
51. Silva JG, Santana CG, Inocêncio KR, et al. Electrocortical Analysis of Patients with Intercostobrachial Pain Treated with TENS after Breast Cancer Surgery. *J Phys Ther Sci*. 2014; 26(3): 349-53.
52. Dalzell MA, Smirnow N, Sateren W, et al. Rehabilitation and exercise oncology program: translating research into a model of care. *Curr Oncol*. 2017 Jun; 24(3): e191-e198. Published online 2017 Jun 27.
53. Wolin KY, Schwartz AL, Matthews CE, et al. Implementing the exercise guidelines for cancer survivors. *J Support Oncol*. 2012 Sep-Oct; 10(5): 171-7.
54. Gatt M, Willis S, Leuschner S. A meta-analysis of the effectiveness and safety of kinesiology taping in the management of cancer-related lymphedema. *Eur J Cancer Care (Engl)*. 2016.
55. Bošković L, Gašparić M, Petković M, et al. Bone health and adherence to vitamin D and calcium therapy in early breast cancer patients on endocrine therapy with aromatase inhibitors. *Breast*. 2017; 31: 16-19.
56. Van Poznak C, Somerfield MR, Barlow WE, et al. Role of Bone-Modifying Agents in Metastatic Breast Cancer: An American Society

- of Clinical Oncology-Cancer Care Ontario Focused Guideline Update. *J Clin Oncol*. 2017; 35(35): 3978-3986.
57. Ligibel JA, Giobbie-Hurder A, Shockro L, et al. Randomized trial of a physical activity intervention in women with metastatic breast cancer. *Cancer*. 2016; 122: 1169-77.
58. von Moos R, Costa L, Ripamonti CI, et al. Improving quality of life in patients with advanced cancer: Targeting metastatic bone pain. *Eur J Cancer*. 2017; 71: 80-94.